LVI. *An Account of an Encrinus, or Star-fiſh, with a jointed Stem, taken on the Coaſt of* Barbadoes, *which explains to what kind of Animal thoſe Foſſils belong, called Starſtones, Aſteriæ, and Aſtropodia, which have been found in many Parts of this Kingdom: In a Letter to Mr.* Emanuel Mendes da Coſta, *F. R. S. By* John Ellis, *Eſq; F. R. S.*

SIR,

Read Dec. 17, 1761. I Need not inform you, that the writers on natural hiſtory have been much at a loſs to diſcover to what kind of animals thoſe petrified bodies have properly belonged, which are known to us by the name of trochites, entrochi, carpophylloides, encrini, aſteriæ, &c. and therefore, it is with the greater pleaſure I lay before the Royal Society a recent animal of the rareſt of this claſs.

Mr. Maſon of Barbadoes, remarkable for his curious experiments in magnetiſm, by deſire of my friend Dr. Alexander Bruce, of that iſland, in the month of May 1760, brought me this rare lithophyton, as the doctor called it; but I being in the country, it fell into the hands of my worthy friend Dr. John Fothergil, who was ſo kind to ſend it me, to deſcribe, and to oblige the Royal Society with a ſight of it.

Dr. Bruce informs me, that they are the inhabitants of thoſe ſeas, and that he is in hopes of ſending me over a more perfect ſpecimen.

Mr.

Mr. Guettard, that able and curious naturaliſt, has given, in the Memoirs of the Academy of Sciences at Paris, publiſhed in 1761, for the year 1755, a moſt minute deſcription and diſſection of an animal of this kind, from the curious cabinet of Madam Bois Jourdain of Paris; it was ſent from Martinico by the name of palma marina; the head of it, being more perfect than ours, has ſome reſemblance to the branches of a palm tree.

However, as there is ſome little difference in the figure of both theſe animals, and as I, about a year ago, had the honour of exhibiting to the Royal Society a curious drawing of it, which Dr. Gartner, of Stutgart in Wurtenburg, F. R. S. drew for me, I ſhall give the deſcription that occurred to me, upon the beſt examination I could take of it, without diſſecting, or breaking the ſpecimen.

As it comes neareſt to the foſſils called encrini, or lilii lapidei, I ſhall ſtill keep that name, and call it

Encrinus, Capite ſtellato ramoſo-dichotomo,
Stipite pentagono equiſetiformi.

The ſtem and head of this animal, in its preſent ſtate, meaſures about fourteen inches. The ſtem is about thirteen inches in height, and about the third of an inch in diameter, leſſening a little towards the top: it is formed of pentagonous joints, or vertebræ, placed regularly over one another, which are of a teſtaceous ſubſtance, and united by very thin cartilages; as appears, by examining minutely the baſe of the loweſt vertebra, where it is faſtened to the ſtarry indentures of the joint: this makes the vertebræ capable

pable of bending at the will of the animal, in any direction.

If we examine the five furrows or channels along the ſtem, we ſhall diſcover a ſmall hole between every vertebra, and in the center of the baſe of the loweſt, we ſhall find a ſmall hole there, which, probably, communicates through the middle of all the vertebræ to the cavity in the center of the head.

Along this ſtem, at different diſtances, from an inch and quarter to a quarter of an inch in length, we obſerve many ſeries of five cylindrical-jointed arms, each ſeries is of equal length, and placed in a wheel or whirl-ſhaped form like the equiſetum or horſetail plant. Each arm is inſerted in one of the five cavities of a vertebra, and each joint into one another; that the upper end of one joint inclines over the lower end of the next to it, which it appears, at the ſame time, to incloſe with a ſmall margin.

Theſe joints are generally about one twelfth of an inch in length, and the ſame in diameter, except a few near their inſertion in the ſtem, which are ſhorter and thicker the nearer they are to it.

We may plainly trace a ſmall hole here through the midſt of the joints, which communicates through the center of the ſtarry vertebræ in the main ſtem, to the hooked joint at the extremity of theſe arms.

On the under or inner ſide of thoſe joints, that are near the end of the arms, we may diſcover four minute tubercles in every joint, two at each end; theſe are of the ſame teſtaceous ſubſtance with the reſt of the joint. By means of this uneven ſurface, together with the hook, which the laſt joint forms, bending downwards,

wards, the animal can take a more ſecure hold of whatever it ſeizes.

But as the ſtem of this animal appears evidently to be broke off ſhort at the bottom, we muſt remain in doubt, whether it moves about in the ſea, or is fixed to rocks and ſhells by a baſe, like corals, ſponges, and keratophytons, until ſome future diſcovery ſhall clear up this matter more to our ſatisfaction.

In examining the main ſtem, or column, we may obſerve ſome ſingle joints or vertebræ projecting a little farther than the reſt. There are generally three or four of theſe in each diviſion, between the whirls of arms; the angular parts of theſe joints end in ſmall round knobs; but the knobs at the corners of the vertebra, immediately under the head of the animal, are remarkably larger than the reſt.

The joints or vertebræ of the ſtem vary in thickneſs, as well as in diameter; the common thickneſs is about one tenth of an inch; but in the laſt four diviſions approaching towards the head, they gradually diminiſh, till they become extremely thin.

We now come to what is called the head, perhaps the body of the animal; for in the center of this dry ſpecimen, there ſtill remains a cup of a cruſtaceous ſubſtance, and of an oval form, about an inch in length, three quarters of an inch over, and a quarter of an inch deep; in the center of this, as was obſerved before, is a ſmall hole, which apparently communicates with the internal part of the vertebræ of the ſtem: in this cup, or cavity, it is probable, were the inteſtines and ſtomach of the animal, as in the aſterias, called caput Meduſæ. This cup is ſupported by the

baſes

baſes of ſix dichotomous teſtaceous arms, or branches, (perhaps five is the natural number, for one ſeems irregularly placed.) Theſe lower parts, or baſes of the branching arms, conſiſt of three joints each, and ſurround the cup, to which they ſeem united: each of theſe divide into two other jointed branches, that are round or convex on their under ſide, but flattiſh on the upper, with a deep groove running along the middle, which is furniſhed with two rows of ſuckers, as in the ſepiæ and aſteriæ. From the upper edges of each alternate joint of theſe branches, ariſe two rows of ſmall jointed claws, like fingers; theſe two oppoſite rows bend in towards each other: each ſmall branch, or finger, is about half an inch long, and one twentieth of an inch broad; the ſize of theſe joints diminiſh a little, till you come to the laſt joint, which ends in a point. Each of theſe joints is pointed at top, and being concave, embraces the lower convex part of the next above it; theſe are likewiſe furniſhed on their concave ſide with two rows of ſuckers, claſping together; they ſecure their prey with theſe oppoſite claws, or fingers.

As the finer and more ſubdivided branches were broken off, when I received this ſpecimen, I ſhall, in order to give ſome idea of them, lay before the Society drawings from two curious foſſils, belonging to the excellent cabinet of Mr. Francomb. One of them (B) ſhews all the ramified arms of the head cloſed up together, and the other (C) plainly ſhews the ſmall internal claws, or fingers, proceeding from theſe arms. Theſe were found at Pyrton-paſſage in Glouceſterſhire. The foſſils themſelves, with that of

the encrinus ſent me from Barbadoes (A), [*Vide Tab.* XIII.] I have now the honour of laying before the Royal Society

I am,

SIR,

Your moſt obedient ſervant,

Park-Street, Weſtminſter,
Dec. 17, 1761.

John Ellis.

P. S. In order to give a clearer idea of this curious animal, I have added another plate, [*Vide Tab.* XIV.] taken from the French engraving of their encrinus; and, to illuſtrate the plates, I have given a particular deſcription of both of them, with proper references.

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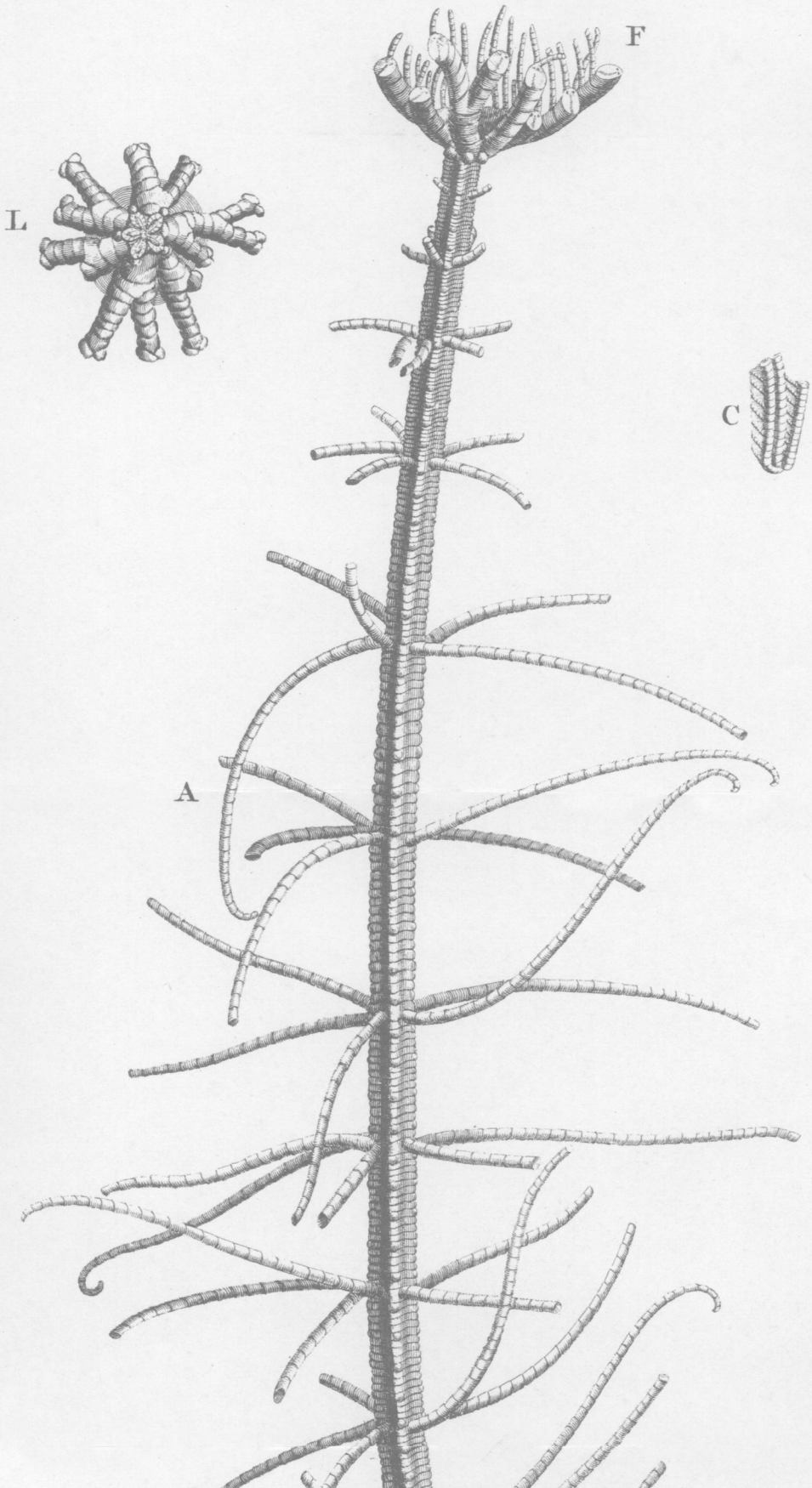
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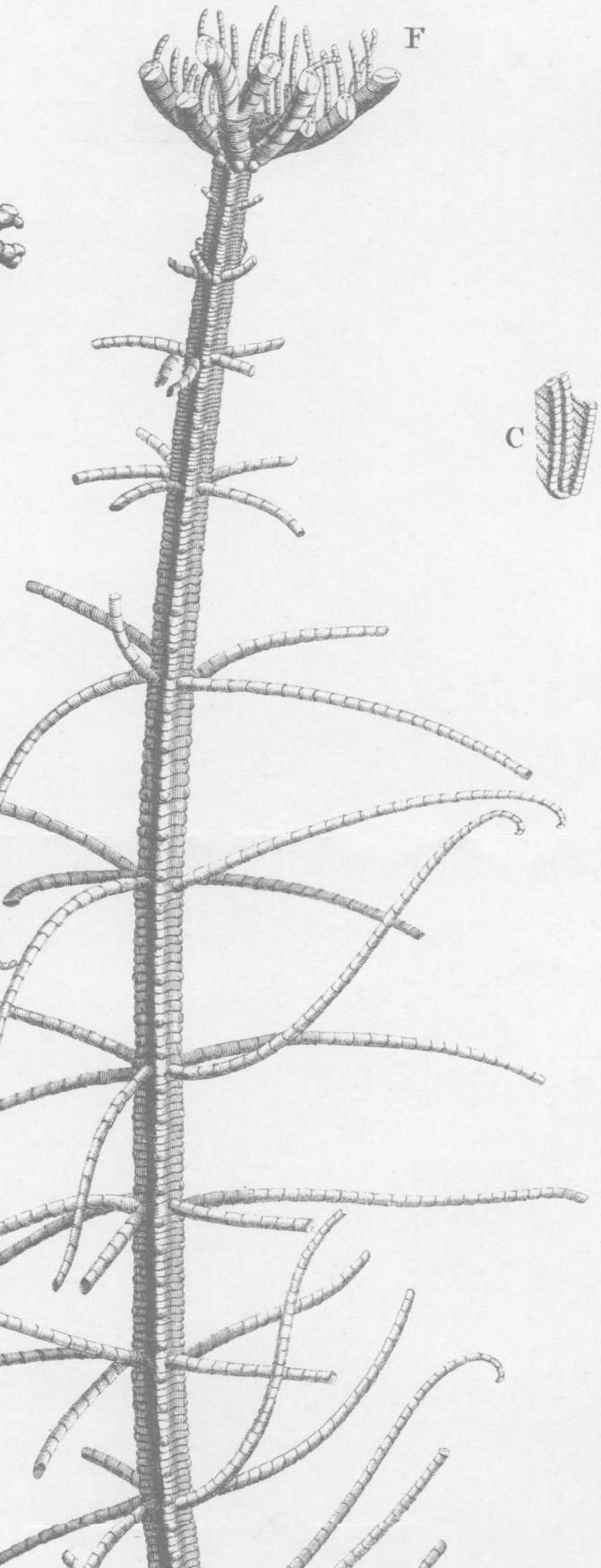
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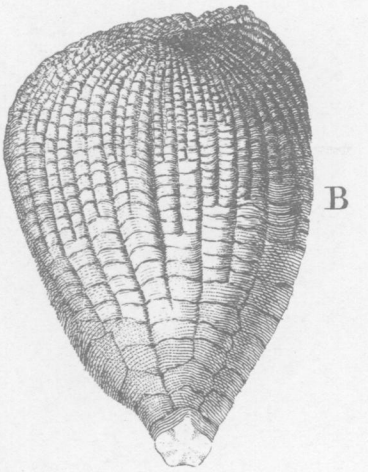
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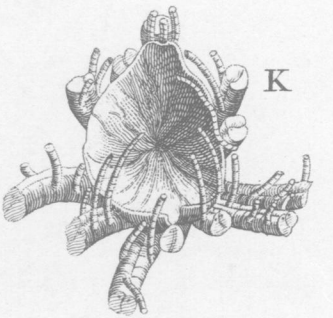
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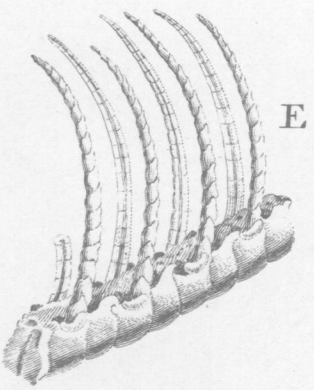
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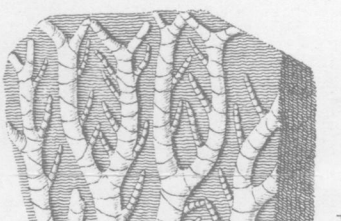

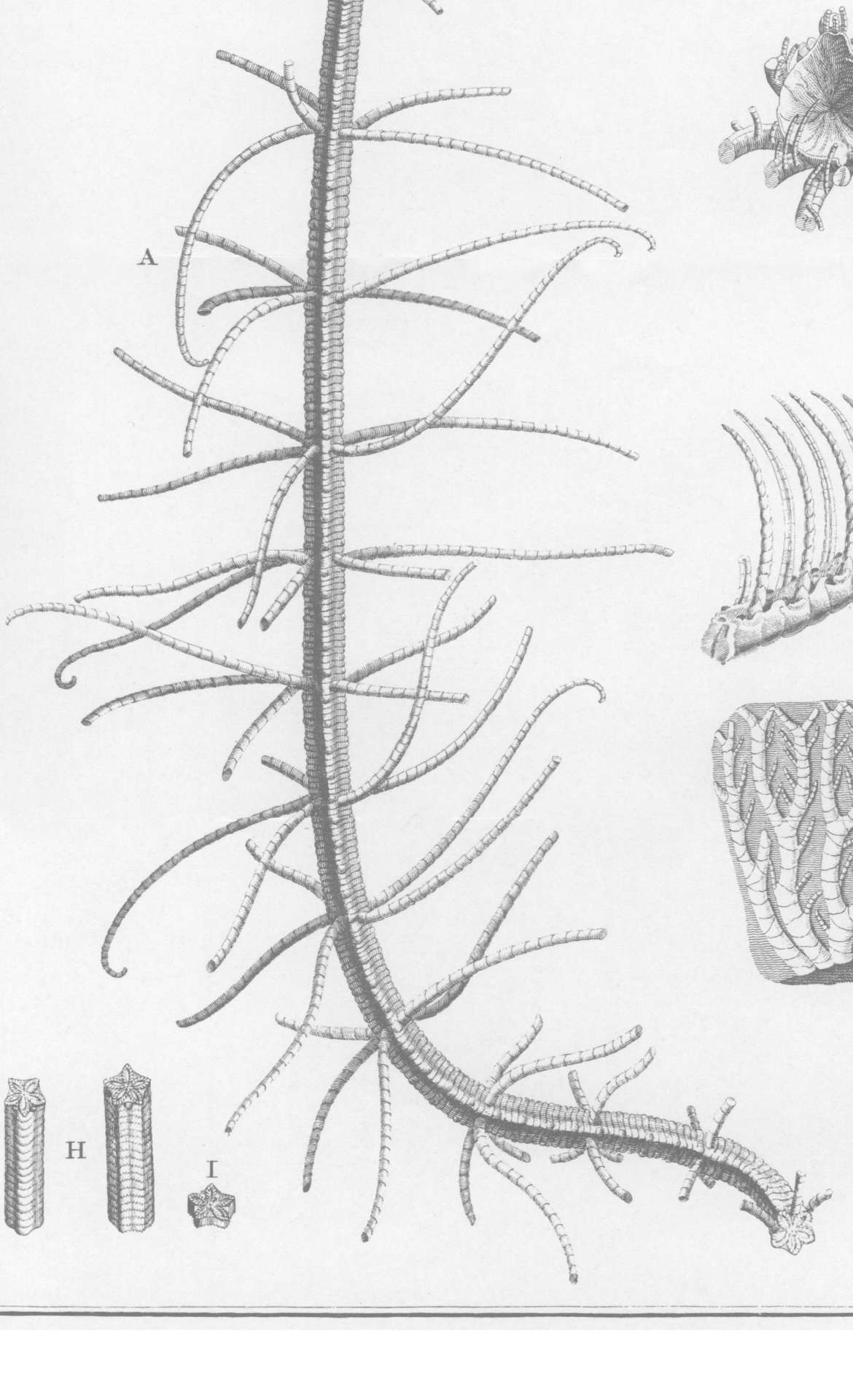
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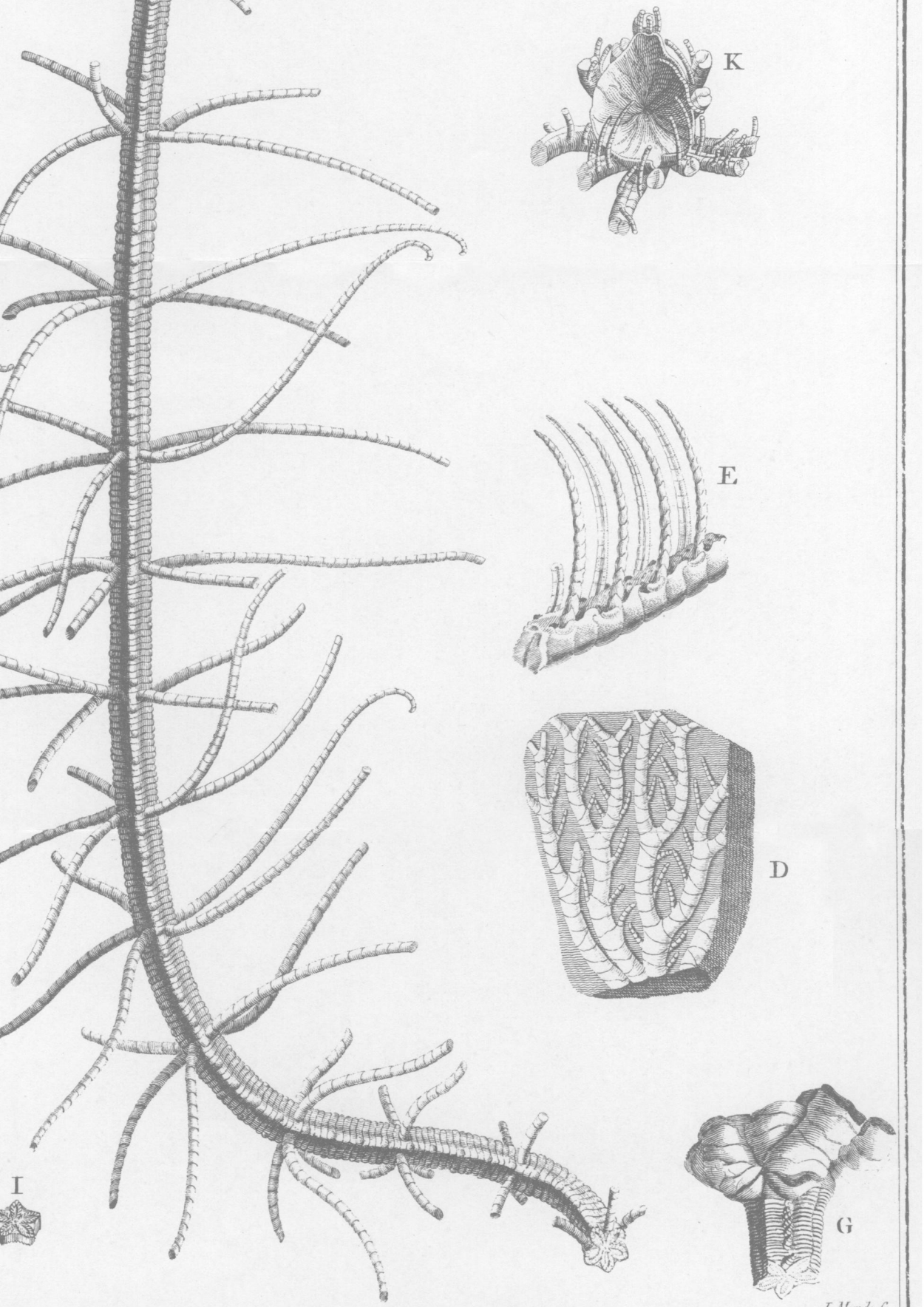
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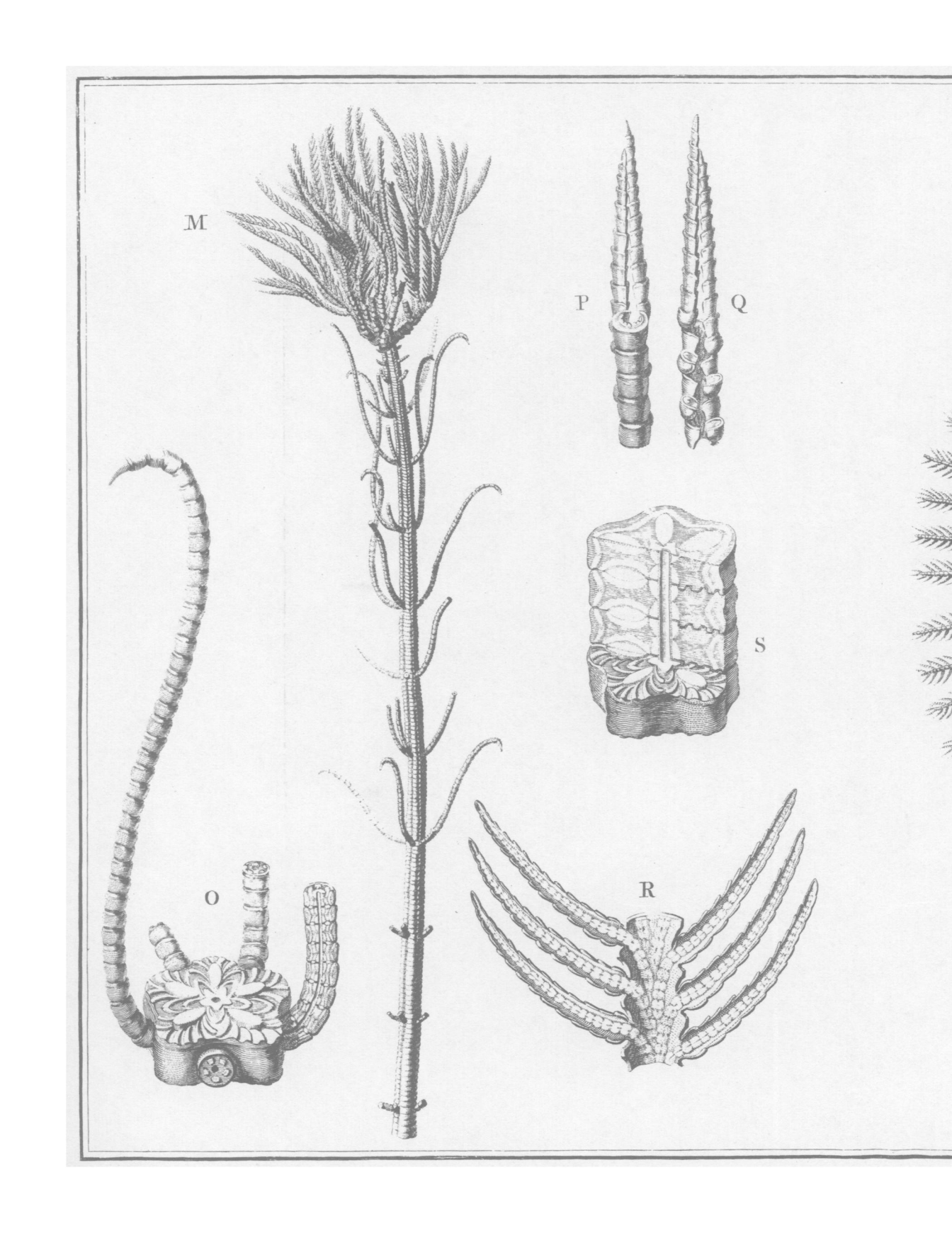
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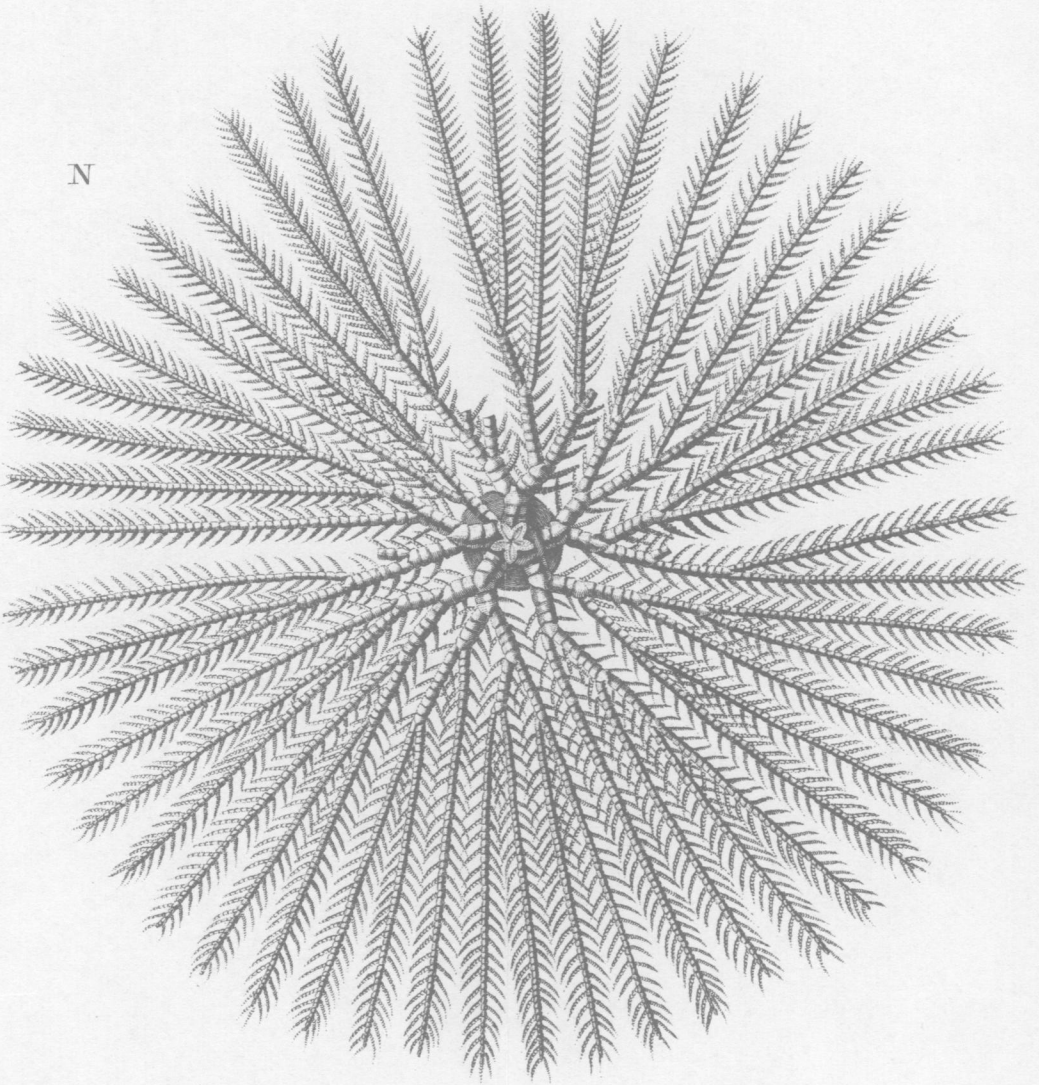

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The Deſcription of the PLATES.

Plate N° XIII. repreſents, at

A The exact ſize of the Barbadoes encrinus, or the branched headed ſtarfiſh, with a pentagonous jointed ſtem, having many ranges of cylindrical jointed claws, diſpoſed, at particular diſtances round the ſtem, in form of rays.

B A curious foſſil found at Pyrton-paſſage in Glouceſterſhire, being evidently the head of an encrinus, or ſtarfiſh, of the ſame kind, with all its ſubdivided branches drawn in cloſe together.

C This foſſil, which was found at the ſame place with the former, exhibits part of a branch belonging to the head of the ſame animal, wherein the inward fine jointed fibres, or fingers, exactly agree with the recent ſpecimen.

D A foſſil copied from Roſinus, repreſenting the ſubdiviſion of the branches of the head, with the jointed fibres, or fingers, as in the foregoing.

E A piece of a branch of the head of the Barbadoes encrinus, at F, magnified, to ſhew the diſpoſition of the joints of the fibres, or fingers.

F The mutilated branches of the head of the Barbadoes animal.

G A foſſil aſteria, found in Marſton-truſſel in Northamptonſhire, and copied from Morton's hiſtory of that county, Tab. X. Fig. 19. This plainly appears to be the top of a columnar ſtem, with part of the branches of the head of one of theſe animals.

H Two pieces of the common foſſil aſteriæ, one with its joints united by ſutures, the other plain. This foſſil is well deſcribed by Dr. Liſter, in the Philoſoph. Tranſ. N° 112. p. 274. Tab. II.

I Repreſents one ſingle joint of the foſſil aſteria.

K The cavity at the top of the head, or rather the cavity in the center of the branched arms of the Barbadoes encrinus, where we may reaſonably ſuppoſe the ſtomach and inteſtines were contained.

L The under part of the head, to ſhew the inſertion of the arms.

Plate N° XIV. repreſents, at

M The Martinico encrinus, or branched headed ſtarfiſh, with a jointed ſtem, ſent to Madam Bois Jourdain, of Paris, by the name of palma marina. This figure is much leſs than the original, which is eighteen inches long.

N The under part of the head, with the arms divided in a dichotomous or twofold manner, and diſpoſed like branched rays, each of which is furniſhed with ranges of ſmall fingers, or jointed fibres, placed on each ſide in an alternately pinnated order.

O One of the joints of the main ſtem magnified. In this figure, the five jointed cylindrical claws, which are inſerted in the hollow parts of the vertebra, or joint, are exhibited in different views, as well to diſcover their inward as their outward form and texture. On the upper ſurface of this joint, are moſt elegantly expreſſed thoſe curious indentations, which connect the vertebræ together, con-

taining a cartilaginous ſubſtance, that gives ſtrength and pliancy to the animal, to move the main ſtem in any direction.

P The outſide of a part of one of the ſmall arms of the head, with two of the jointed fibres, or fingers, cloſed together.

Q The inſide of the ſame figure.

R This figure expreſſes the ſame part of the animal, but with ſix fingers placed alternately oppoſite; all which, as well as part of the arm, in which they are inſerted, are repreſented expanded, to ſhew the form and diſpoſition of the ſuckers, which are of the ſame kind in this animal, as in the ſepiæ and aſteriæ, or what we call the cuttlefiſh and ſtarfiſh.

S This repreſents four vertebræ of the ſtem, three of which are cut perpendicularly through the middle, to ſhew part of the ſmall tube, which paſſes through the center of all the joints, and to give a view of the uniting of the indentations.